

Is the presence of sedentary behaviour or the absence of physical activity responsible for fat mass and appetite dysregulation? Preliminary results from the DAPHNE project.

MYERS, Anna <<http://orcid.org/0000-0001-6432-8628>>, FINLAYSON, G., BLUNDELL, J. and GIBBONS, C.

Available from Sheffield Hallam University Research Archive (SHURA) at:
<https://shura.shu.ac.uk/18259/>

This document is the Accepted Version [AM]

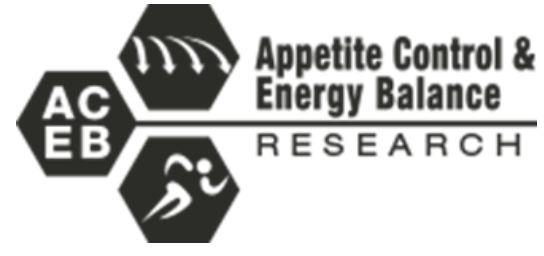
Citation:

MYERS, Anna, FINLAYSON, G., BLUNDELL, J. and GIBBONS, C. (2015). Is the presence of sedentary behaviour or the absence of physical activity responsible for fat mass and appetite dysregulation? Preliminary results from the DAPHNE project. In: European Congress on Obesity, Prague, 6th-9th May 2015. [Conference or Workshop Item]

Copyright and re-use policy

See <http://shura.shu.ac.uk/information.html>

Is the presence of sedentary behaviour or the absence of physical activity responsible for fat mass and appetite dysregulation? Preliminary results from the DAPHNE project.



¹Myers A, ¹Finlayson G, ¹Blundell J, ¹Gibbons C.

¹Appetite Control & Energy Balance Research, School of Psychology, University of Leeds, Leeds, UK

Contact: a.myers@leeds.ac.uk



Background

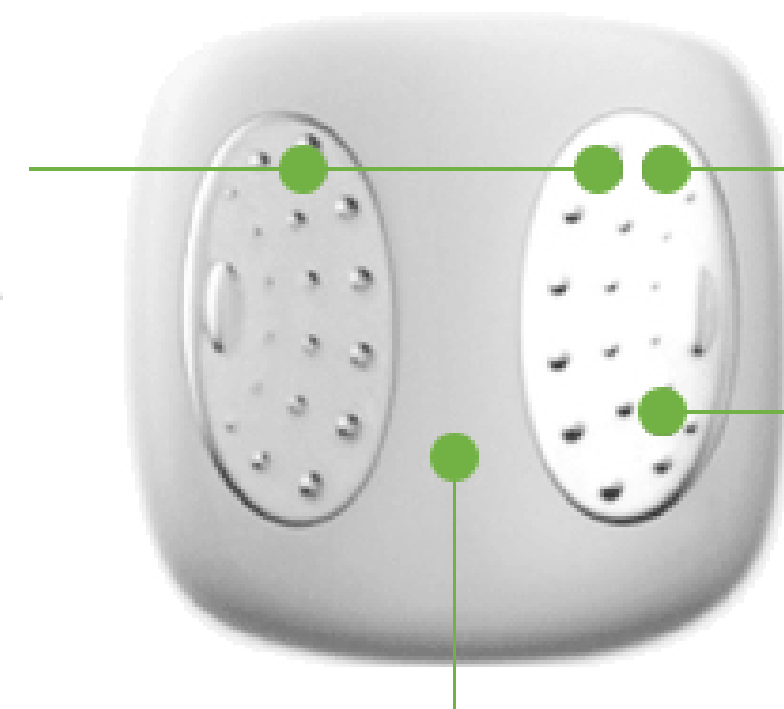
- It is well established that moderate-to-vigorous physical activity (MVPA) contributes to the prevention of non-communicable diseases. More recently, sedentary behaviour has been linked with deleterious health outcomes independent of the amount of MVPA performed^{1, 2}.
- Sedentary behaviour has also been linked to unhealthy dietary intake but little is known about the association between objectively measured sedentary behaviour and appetite control³.

Aim

- The present study employed an innovative validated device for the objective measurement of sedentary and active behaviour to investigate whether measures of sedentary and active behaviours were associated with body composition or appetite dysregulation.

Galvanic Skin Response

When you sweat, your skin becomes more electrically conductive. This measurement helps to see how active you are.



Skin Temperature

Measures the surface temperature of your body.

Heat Flux

Measures the rate at which heat is dissipating from your body.

3-axis Accelerometer

Measures your motion and steps taken.



Figure 1. SenseWear armband specifications and positioning.

Methods

- 58 participants (13 males, 45 females) visited the Human Appetite Research Unit on two occasions (age 37.0 ± 13.8 years, BMI 28.6 ± 4.9 kg/m²).

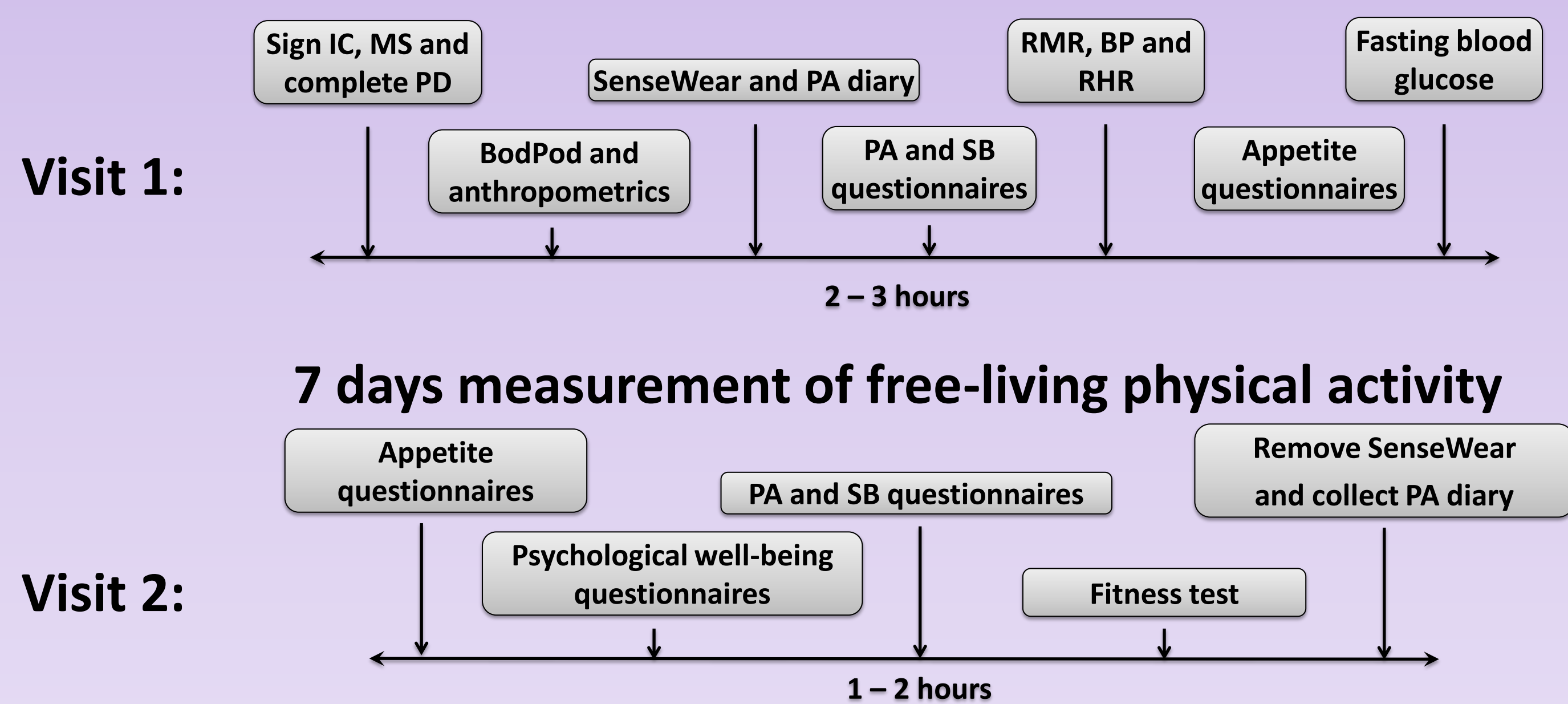


Table 1. Measurement methods.

	Free-living PA	Body composition	Cardiovascular fitness	Resting metabolic rate	Appetite dysregulation
Measurement method	SenseWear mini	Bodpod	Indirect calorimetry	Indirect calorimetry	Three-Factor Eating Questionnaire; Binge Eating Scale

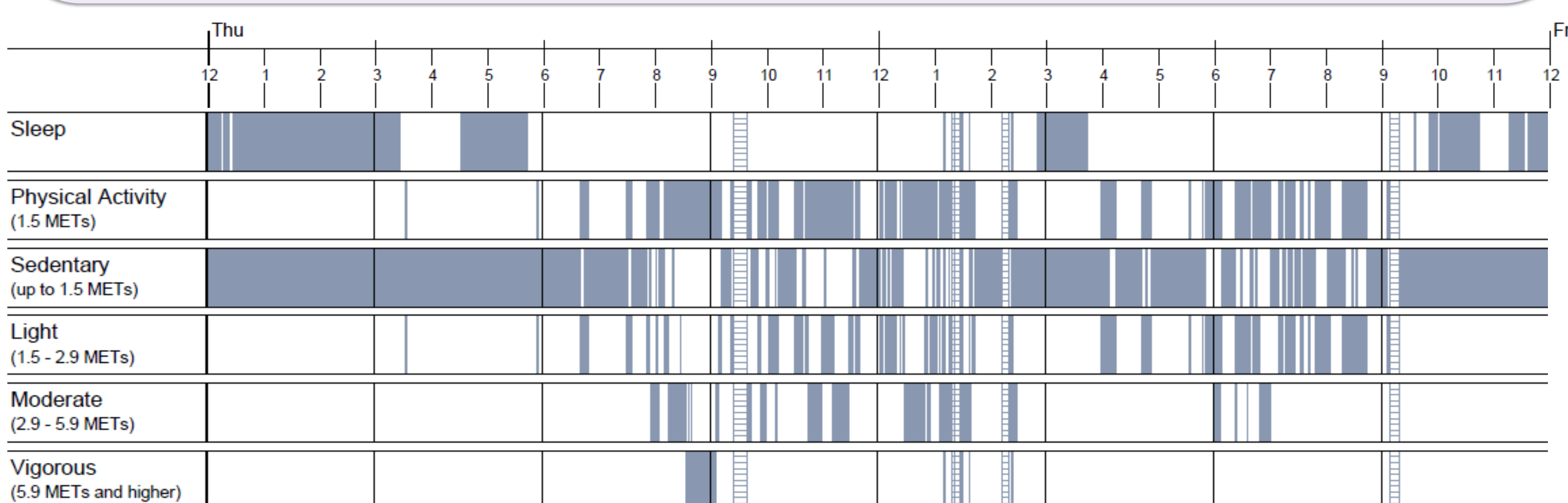


Figure 2. Participant A - 24 hour PA profile.

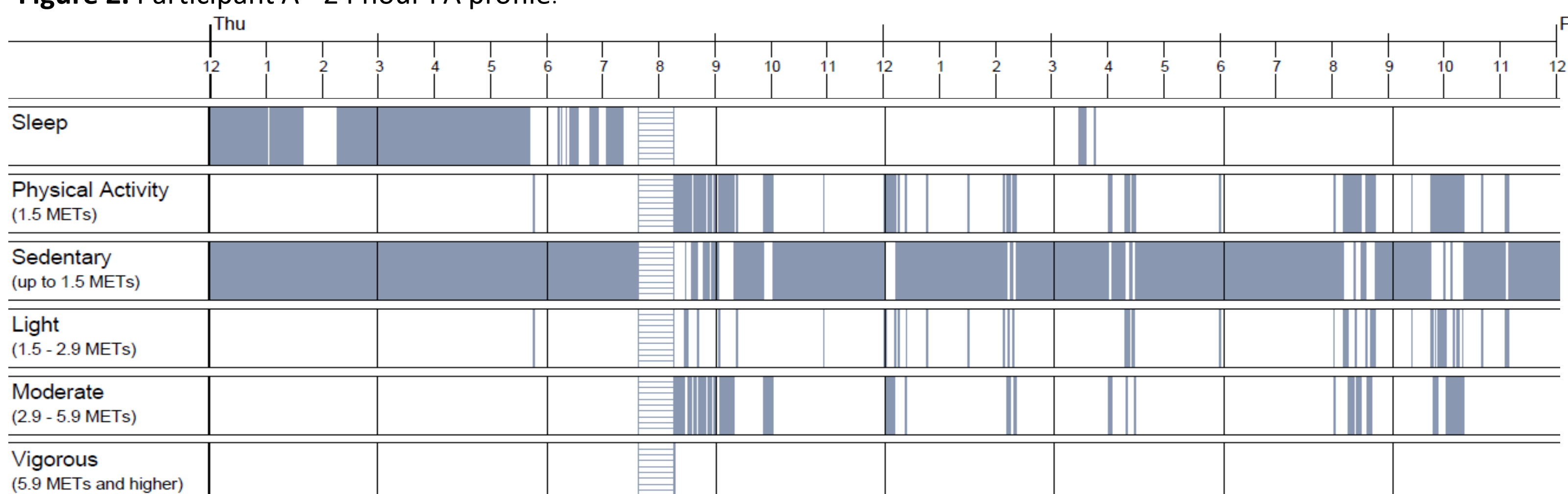
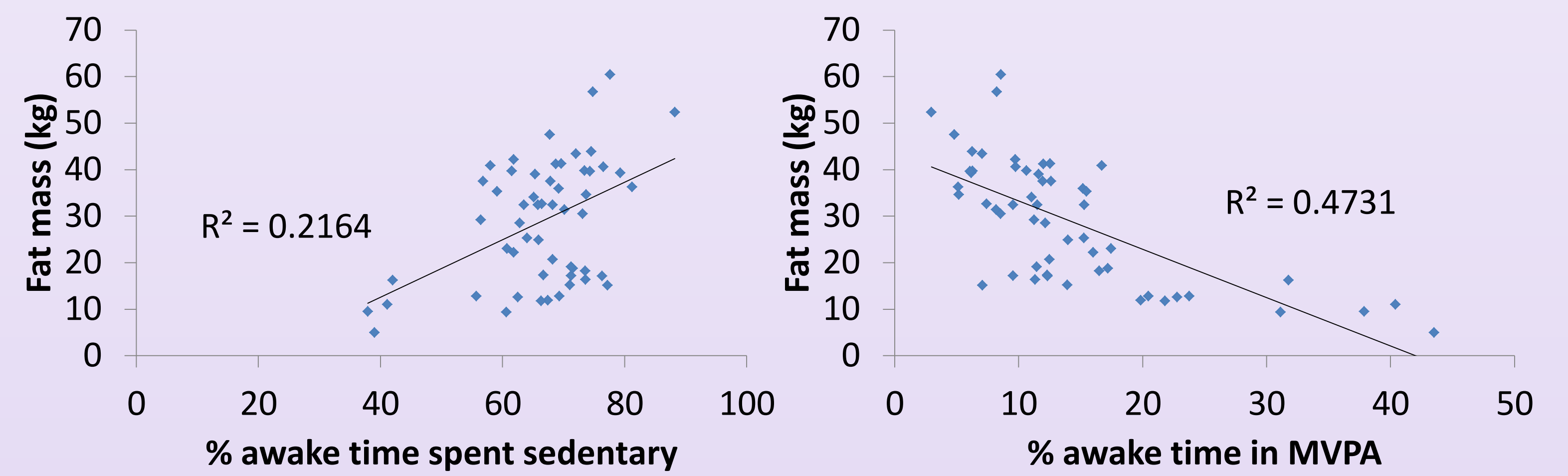


Figure 3. Participant B - 24 hour PA profile.

Results

- Sedentary behaviour was positively associated ($r = 0.4 - 0.47$, $p < 0.05$) and MVPA negatively associated ($r = -0.52 - -0.71$, $p < 0.01$) with multiple indices of adiposity.



- After controlling for MVPA the correlations between sedentary behaviour and adiposity were no longer significant, however when the correlations between MVPA and adiposity were adjusted for sedentary behaviour they remained significant.

Table 2. Correlation between active and sedentary behaviours and indices of adiposity.

	Body mass	BMI	Fat mass	% fat mass	WC
Sedentary behaviour ¹	-0.04	-0.22	-0.24	-0.35†	-0.16
MVPA ²	-0.37†	-0.61†	-0.60†	-0.68†	-0.52†

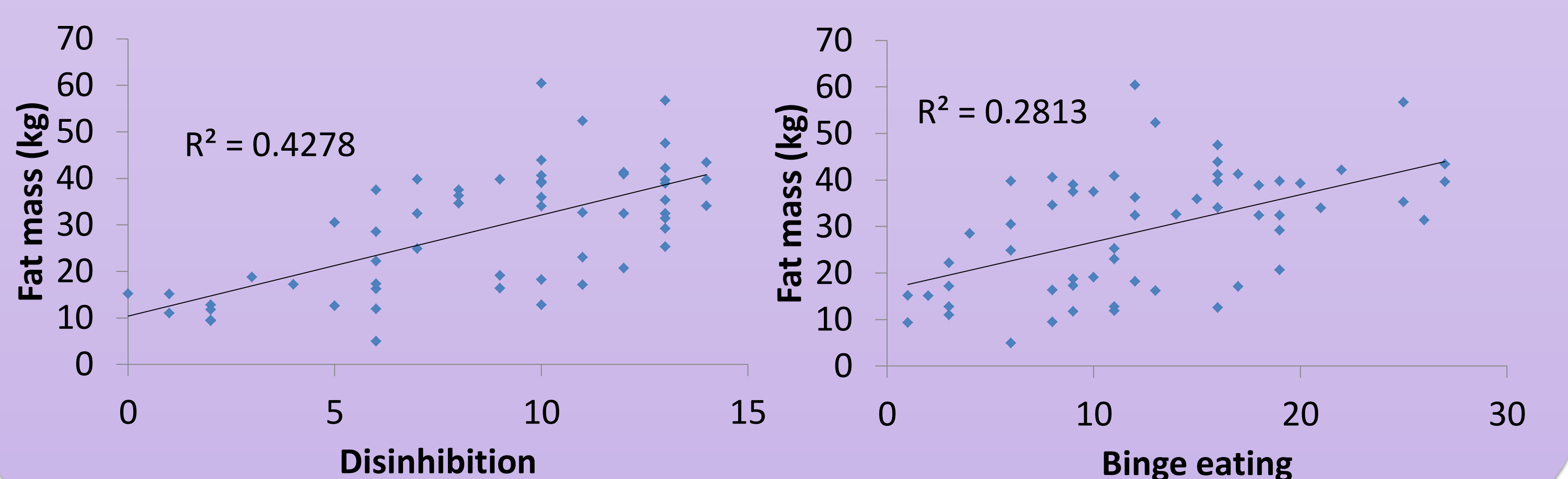
n=55; data are Pearson correlations (r). ¹ controlled for MVPA in minutes; ² controlled for sedentary time in minutes. *p<0.05; †p<0.01. Waist circumference (WC).

- Higher levels of adiposity were associated with higher levels of TFEQ Disinhibition and Binge Eating. However there was no association between physical activity and sedentary behaviour with appetite dysregulation after controlling for adiposity.

Table 3. Correlation between indices of adiposity, active and sedentary behaviours and appetite dysregulation.

	Body mass	BMI	Fat mass	% fat mass	WC	SED ¹	MVPA ¹
Disinhibition	0.51†	0.68†	0.65†	0.65†	0.61†	-0.14	-0.12
Binge eating	0.45†	0.50†	0.53†	0.49†	0.52†	-0.18	-0.08

n=58; data are Pearson correlations (r). ¹ controlled for % fat mass (n=55). †p<0.01. Waist circumference (WC); SED (sedentary behaviour); energy expenditure (EE).



Conclusion

- The absence of MVPA may be more important than the presence of sedentary behaviour for the accumulation of body fat.
- Higher adiposity was associated with markers of appetite dysregulation (Disinhibition and Binge Eating).
- After controlling for adiposity, physical activity and sedentary behaviour were not associated with appetite dysregulation.
- Further research will investigate the relationships amongst physical activity, sedentary behaviour and appetite control using a robust methodological platform over a 14 week period.

References

- Warburton, D.E. et al. Health benefits of physical activity: the evidence. Canadian Medical Association Journal. 2006, 174(6), pp.801-809.
- Biswas, A. et al. Sedentary Time and Its Association With Risk for Disease Incidence, Mortality, and Hospitalization in Adults: A Systematic Review and Meta-analysis. Annals of Internal Medicine. 2015, 162(2), pp.123-132.
- Pearson, N. and Biddle, S.J. Sedentary behavior and dietary intake in children, adolescents, and adults: A systematic review. American journal of preventive medicine. 2011, 41(2), pp.178-188.

Acknowledgements

This research is supported by the EU grant agreement number 610440.